

REMARKS

Claims 1-9, 11-13 remain under active prosecution in the present application. Claim 10 is amended. Claims 13-18 have been added. Applicants respectfully assert that all amendments are supported by the original disclosure and do not introduce new matter. Moreover, Applicants further respectfully assert that the amendments merely clarify the scope of the claims.

In the subject Office Action dated June 25, 2004, claim 10 was rejected under 35 U.S.C. § 112 as being indefinite; specifically, it was not clear to the Examiner how the anvil forms an inwardly biased relation to the elongate channel. Applicants have amended claim 10 to recite that a closure member transfers the closure motion to inwardly bias together distal ends of the anvil and elongate channel, providing clarification as to the source of the bias and the particular result.

Claims 1-3 and 6-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Green et al (US 6,619,529) in view of Bishop et al (US 5,662,662). Claims 4 and 5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Green et al in view of Bishop et al as applied to claims 1-3 and in further view of Bolanos et al (US 5,575,799).

Turning to independent claim 1, the claim as amended recites in part a surgical instrument having a firing mechanism responsive to a firing motion including an actuating portion having a first thickness and coupled for movement and positioned in the end effector. The longitudinal strip is also formed from an articulation portion proximally attached to the actuating portion and having a second thickness less than the first thickness transverse to its width and coupled for articulating movement through an articulation mechanism of the shaft. The second thickness is aligned with an axis of articulation for resilient bending and the substantially larger width of the elongate longitudinal strip minimizes bending normal to the plane of articulation to reduce binding.

Claim 1 was rejected under 35 U.S.C. 103(a) as being unpatentable over Green et al in view of Bishop et al, with the following discussion given in particular regarding the firing mechanism:

What Green does not disclose is a firing mechanism that varies in thickness transversely or horizontally. However, Bishop teaches that it is old and well known in the art of surgical tools to provide an articulated tool with a shaft 84, that contains an actuation device comprised, which passes through the articulation mechanism, and is comprised of cable [194 and connector] 196 having a section that is smaller the a

driver 312 for the purpose of providing a larger surface area to drive the staple (see Figs. 1,16,17, C12, 116-28 and C19.L37-44).

While the lateral dimensions of the former plate 312 and the flexible cable 194 of Bishop may differ, the flexible cable 194 does not present a smaller thickness as compared to its width in order to provide advantages during articulation. Insofar as the flexible cable 194 has a circular cross section and is rotated during articulation within the articulation mechanism, Bishop teaches away from presenting a width that resists bending in one direction (width) while resiliently bending transverse to its thickness. The term “thickness” is understood to be “the dimension between two surfaces of an object, usually the dimension of smallest measure.” *The American Heritage® Dictionary of the English Language, Fourth Edition*. The cable 194 taught by Bishop goes away from this understanding by not having a thickness per se but rather a diameter.

In addition, neither Green nor Bishop appreciate the problem addressed by the claimed invention of claim 1, specifically having a second thickness aligned with an axis of articulation for resilient bending, and thus there is no motivation or suggestion to make the necessary modifications to achieve this result. Applicants assert that rather Green and Bishop teach away from addressing this problem. In particular, Green teaches a knife 240 that is not thinned as the Examiner noted, but that in addition teaches four cam bars 286 that have to move and bend along side the knife 240 about the transverse axis 90, presenting additional loads to fire the knife/cam bar assembly. Bishop teaches away from a thinner firing mechanism by teaching instead a flexible cable 140 that undulates within the shaft, as depicted in FIG. 11. Bishop notes the increased friction presented by this arrangement (Col. 29, lines 44-48).

Insofar as the cited references either singularly nor in combination failed to teach or suggest the claimed combination of claim 1, the claim as amended is allowable. Reconsideration and allowance of claim 1, as well as claims 1-5 and 18 that depend therefrom, is respectfully requested.

Turning to independent claims 6 and 11, the claims both recite in part a firing device including a distally presented cutting edge longitudinally received between an elongate channel and an anvil and a thinned strip portion transitioning through an articulation mechanism.

The Examiner rejected claim 6 on the same basis as noted above for claim 6 with the same disclosures in Green and Bishop. However, for the reasons given above by the Applicants for claim 1, the cited references fail to teach or suggest a thinned strip portion passing through the articulation mechanism, but rather teach either a plurality of unthinned strips (Green) or a circular cable (Bishop). And thus claim 6 is allowable over the cited references. Reconsideration and allowance of claim 6, as well claims 7-10, and 14-16 that depend therefrom, is respectfully requested.

Turning to independent claim 11, the claim as amended recites in part a firing bar head positioned for longitudinal movement in an end effector. This firing bar head is distally aligned with, thicker than, and connected to an elongate strip. The Examiner rejected claim 11 on the same basis and citing the same disclosures as given for claim 1. For the reasons that the Applicants have given above for claim 1, reconsideration and allowance of claim 11, as well as claims 12-13 and 17 that depend therefrom, is respectfully requested.

With further reference to claims 4 and 5 that depends from claim 1, the claims as amended recite a further feature wherein the articulation mechanism responds to the rotational articulation motion of a drive tube with gear section engaged to a spur gear by articulating the end effector in an articulation plane bisected by a longitudinal axis of the shaft.

Claims 4 and 5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Green et al in view of Bishop et al as applied to claims 1-3 and in further view of Bolanos et al (US 5,575,799). The Examiner relied upon Bolanos to teach the additional feature presented by claims 4 and 5. However, Bolanos does not teach or suggest the amended feature of articulating in an articulation plane bisected by the longitudinal axis of the shaft. Instead, a helical gear of Bolanos causes the end effector to rotate in a fashion that rotates the end effector in three dimensions with respect to the longitudinal axis. Thus, this articulation may complicate positioning of the end effector for the surgeon. By contrast, articulating in a plane presents a different orientation of the end effector, moving in a simple manner to either lateral side of the shaft. Thus, three-dimensional articulation is not dictated, although can still be achieved if desired with independent controls, allowing more intuitive controls and flexibility. Further, this three-dimension rotation about the helical gear may not be combined with the thinned articulation portion of the firing mechanism in a straight forward fashion to achieve the result of reduced friction to the firing mechanism passing through the

articulation mechanism since the firing mechanism as claimed would have to twist during this helical articulation.

Since this claimed combination of articulating in a plane in response to a rotational motion of a drive tube in gear engagement to a spur gear of the end effector is not taught or suggested by the cited references, claims 4 and 5 should be allowable for these additional reasons. Reconsideration and allowance of claims 4 and 5 is respectfully requested.

Conclusion

In light of the amendments and remarks made herein, it is respectfully submitted that the claims currently pending in the present application are in form for allowance. Accordingly, reconsideration of those claims, as amended herein, is earnestly solicited. Applicants encourage the Examiner to contact their representative, David Franklin at (513) 651-6856 or dfranklin@fbtlaw.com.

The Commissioner for Patents is hereby authorized to charge any deficiency or credit any overpayment of fees to Frost Brown Todd LLC Deposit Account No. 06-2226.

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